

Application No. 10/687652
Amendment dated 22 August 2005
Reply to Office Action of 20 May 2005

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Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in this application:

Listing of Claims:

1. (Currently Amended) A photomask comprising at least two layers of inorganic materials, wherein when heated, the inorganic materials from the at least two layers combine to form a resultant material, the resultant material having optical transmission characteristics substantially different from either of the inorganic materials from the at least two layers
a substrate;
a first layer on the substrate, the first layer comprising a first inorganic material;
a second layer on the first layer, the second layer comprising a second inorganic material, the second inorganic material alloyable with the first inorganic material to form a low optical absorbing resultant alloy at a phase transition temperature below melting points of each of the first and second inorganic materials;
the first and second layers together having high optical absorption characteristics.
2. (Previously Presented) A photomask according to claim 1 comprising a transparent protective overcoat.
3. (Previously Presented) A photomask according to claim 2 wherein the overcoat comprises a cross-linked polymer.
4. (Cancelled)
5. (Cancelled)

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6. (Cancelled)
7. (Cancelled)
8. (Cancelled)
9. (Cancelled)
10. (Currently Amended) A photomask comprising first and second areas having different optical characteristics from one another, the first areas comprising a plurality of layers of different inorganic materials, the second areas comprising contiguous regions of an alloy of the inorganic materials, the alloy having a melting temperature lower than melting temperatures of the inorganic materials
a substrate;
an unexposed area comprising a first layer on the substrate, the first layer comprising a first inorganic material;
a second layer on the first layer, the second layer comprising a second inorganic material, the second inorganic material alloyable with the first inorganic material to form a resultant alloy at a phase transition temperature below melting points of each of the first and second inorganic materials; and
an exposed area adjacent to the unexposed area, the exposed area comprising the resultant alloy, the exposed area having significantly greater transmissivity of radiation of a particular wavelength than the unexposed area.
11. (Currently Amended) A photomask according to claim 10 wherein the first unexposed and second exposed areas have different etching characteristics.
12. (Cancelled)
13. (Cancelled)

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14. (Currently Amended) A photomask according to claim 10 wherein the resultant alloy has a melting point below 300 degrees Celsius.
15. (Currently Amended) A photomask according to claim 14 wherein the resultant alloy contains at least 5 percent of one of the first and second inorganic materials.
16. (Currently Amended) A photomask according to claim 10 wherein the resultant alloy comprises a binary alloy selected from the group consisting of: AsPb, BiCd, BiCo, BiIn, BiPb, BiSn, BiZn, CdIn, CdPb, CdSb, CdSn, CdTi, CdZn, GaIn, GaMg, GaSn, GaZn, InSn, InZn, MgPb, MgSn, MgTi, PbPd, PbPt, PbSb, PbSn, SbTi, SeTi, SnTi, and, SnZn.
17. (Cancelled)
18. (Currently Amended) A photomask according to claim ~~[[17]]~~ 10 wherein for radiation of a particular wavelength, the ~~first areas have~~ unexposed area has an optical transmission characteristic of less than 7% and the ~~second areas have~~ exposed area has an optical transmission characteristic of greater than 50%.
19. (Cancelled)
20. (Currently Amended) A photomask according to claim ~~[[19]]~~ 10 wherein the melting point of the resultant material alloy is less than 300 degrees Celsius.
21. (Currently Amended) A photomask according to claim 1 wherein the ~~resulting material~~ resultant alloy has different etching characteristics than those of either of the first and second inorganic materials from ~~the at least two layers~~.
22. (Currently Amended) A photomask according to claim 1 wherein the ~~resulting material~~ resultant alloy comprises one or more of oxides, nitrides or hydrides of an ~~alloy of the inorganic materials from the at least two layers~~.

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23. (Cancelled)
24. (Previously Presented) A photomask according to claim [[23]] 1 wherein the first inorganic material is a single element metal.
25. (Currently Amended) A photomask according to claim [[23]] 1 wherein the resultant material alloy is substantially contiguous with itself and with the first and ~~one or more~~ second layers.
26. (Cancelled)
27. (Currently Amended) A photomask according to claim [[26]] 10 wherein the resultant material alloy is a eutectic alloy of the different metals first and second inorganic materials.
28. (Previously Presented) A photomask according to claim 27 wherein the resultant material alloy comprises a binary alloy selected from the group consisting of: AsPb, BiCd, BiCo, BiIn, BiPb, BiSn, BiZn, CdIn, CdPb, CdSb, CdSn, CdTi, CdZn, GaIn, GaMg, GaSn, GaZn, InSn, InZn, MgPb, MgSn, MgTi, PbPd, PbPt, PbSb, PbSn, SbTi, SeTi, SnTi, and, SnZn.
29. (Currently Amended) A photomask according to claim [[23]] 1 wherein, for radiation of a particular wavelength, a combination of the first and ~~one or more~~ second layers has an optical transmission characteristic of less than 7% and the resultant material alloy has an optical transmission characteristic of greater than 50%.
30. (New) A photomask according to claim 1 wherein the ratio of the thickness of the first and second layers is approximately equivalent to the ratio of the first and second inorganic materials in the resultant alloy.

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31. (New) A photomask according to claim 10 wherein the ratio of the thickness of the first and second layers is approximately equivalent to the ratio of the first and second inorganic materials in the resultant alloy.
32. (New) A photomask according to claim 10 wherein the ~~resulting material~~ resultant alloy comprises one or more of oxides, nitrides or hydrides of an alloy of the inorganic materials from the at least two layers.
33. (New) A photomask according to claim 1 wherein the first and second inorganic materials are different single element metals.
34. (New) A photomask according to claim 10 wherein the first and second inorganic materials are different single element metals.
35. (New) A photomask according to claim 10 made by a method comprising:
depositing the first layer of the first inorganic material on the substrate;
depositing the second layer of the second inorganic material atop the first layer; and,
imagewise exposing the first and second layers to radiation, thereby heating the first and second layers to form the resultant alloy in imagewise exposed regions.
36. (New) A photomask according to claim 1 further comprising a third layer on the second layer, the third layer comprising a third inorganic material, the third inorganic material alloyable with the first and second inorganic materials at a phase transition temperature below individual melting points of the first, second and third inorganic materials.
37. (New) A photomask according to claim 1 comprising a region of the resultant alloy on the substrate, adjacent to the first and second layers.